Maternal mortality in Adiyaman province: A five-year review

Maternal mortality: A five year review

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Abstract

Aim: Maternal deaths in Adiyaman between 2017-2021 and the causes and distribution of these deaths were evaluated. It was aimed to find possible solutions to reduce maternal deaths.

Material and Methods: The maternal mortality rate (MMR) was calculated by dividing the number of maternal deaths by 100,000 live births. In the study, variables such as the place of deaths (province/district, home/hospital), time of death (pregnancy/postpartum), preventability status, direct/indirect death decision, maternal age, and educational status, along with the variation of MMR by years were evaluated. In addition to these data, the delays related to service delivery in deaths were also examined.

Results: MMR was calculated as 23 per hundred thousand in 2017, 7.9 per hundred thousand in 2018, 16.8 per hundred thousand in 2019, 45.4 per hundred thousand in 2020, and 54.7 per hundred thousand in 2021. Five (29.4%) of the deaths were preventable, six (35.3%) could not be prevented, two (11.8%) could not be decided, and for four (23.5%) a Ministry Commission's decision is awaited. Of the five preventable deaths, four (80%) were Type one delay, and one (20%) was Type three delay. It has been determined that mothers who gave birth over the age of 35 in 2017-2020 have a 3.00 times risk of death compared to mothers who gave birth under the age of 35. This risk was found to be statistically significant (p=0.028).

Discussion: Increased maternal age is a significant risk factor, and high-risk pregnancies should be followed closely to reduce maternal mortality.

Keywords

Maternal Mortality, Maternal Mortality Rate, Maternal Age

Introduction

According to the World Health Organization, maternal death is defined as the death of a woman, pregnant or within 42 days of the termination of pregnancy, regardless of the duration and location, from direct or indirect obstetric but non-incidental causes. Deaths such as accidents, burns, homicide, electric shock, poisoning, and suicide not related to any effect of pregnancy are not considered maternal deaths.

According to the World Health Organization, maternal mortality is unacceptably high, and 2017 estimates show that around 810 women worldwide die daily from pregnancy or childbirth complications. In 2017, 295,000 women died during and after pregnancy and childbirth. The vast majority of deaths have occurred in low-resource environments, and most are thought to be preventable (1).

Maternal mortality is one of the main parameters of whether the health system works well. The maternal mortality rate is the number of maternal deaths per 100,000 live births annually. In Turkey, the Ministry of Health initiated the Maternal Mortality Prevention and Monitoring Program in 2007 to reduce maternal mortality. According to the Turkish Statistical Institute it was observed that the maternal mortality rate in Turkey, which was 16.7 in 2010, showed a decreasing trend over the years and decreased to 13.6 in 2018. Worldwide, maternal mortality monitoring systems are being developed, and maternal mortality rates are followed closely. However, the maternal mortality rates in countries that have not developed a suitable system may seem lower than they actually are, since maternal deaths cannot be determined. This shows the need for appropriate detection and monitoring systems for proper assessment (2).

Although maternal deaths are not evenly distributed worldwide, they are not evenly distributed in Turkey. While the highest maternal mortality is seen in Middle East Anatolia, it is seen that it is the lowest in East Marmara, which may be related to access to healthcare and the rural-urban divide (3).

Adiyaman is one of the cities where maternal mortality is high, and these deaths can vary significantly from year to year. This study aims to examine maternal deaths between 2017 and 2021.

Material and Methods

In this retrospective study, maternal deaths that occurred in Adiyaman between 2017 and 2021 were examined. The "Provincial Investigation Commission" decisions for maternal deaths were evaluated with the feedback decisions sent from the "Ministry of Health Maternal Deaths Preliminary Investigation Commission."

The study was conducted in accordance with the Declaration of Helsinki and approved by the Non-interventional Clinical Research Ethics Committee of Firat University (protocol code 10293; date: July 5, 2021). Institutional permission was obtained from relevant authority, with the date 21.09.2022 and number E-13389845-771.

The maternal mortality rate in the study was calculated by dividing the number of maternal deaths by 100,000 live births. Obstetric complications cause direct maternal death due to interventions applied during pregnancy, neglect, incorrect care, or the chain of events mentioned. Moreover, indirect maternal death occurs during pregnancy due to a disease or previous diseases (pre-pregnancy) in the pregnant woman. Incoming, but not of obstetric origin, is also defined as death caused by causes exacerbated by the physiological effects of pregnancy.

In the study, variables such as the place of occurrence of deaths (province/district, home/hospital), time of occurrence (pregnancy/postpartum), preventability status, direct/indirect death decision, maternal age, and educational status, along with the variation of maternal mortality rate by years were evaluated. In addition to these data, delays related to service delivery in deaths were also examined. These:

• Primary delay: The type of delay in which the patient does not decide to get service. As an example, a pregnant woman does not apply to the physician for pregnancy follow-up.

• Secondary delay: The type of delay in which the patient decides to receive service but cannot reach the healthcare service. For example, the patient's inability to come to the health institution due to the closure of the roads.

• Tertiary delay: It is the type of delay in which the patient comes to the health institution but cannot receive the necessary service from the health institution. For example, wrong medical practices can be given.

Statistical analysis

Analyzes were evaluated in 22 package programs of SPSS (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL). The study showed descriptive data as n and % values in categorical data and mean±standard deviation (Mean±SD) values in continuous data. Chi-square analysis (Pearson Chi-square) was used to compare categorical variables between groups. The statistical significance level in the analysis was accepted as p≤0.05.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

Mothers who died between 2017-2021 were included in the study, and 17 maternal deaths occurred between these dates. Three (17.6%) mothers died in 2017, one (5.9%) in 2018, two (11.8%) in 2019, five (29.4%) in 2020, and six (35.3%) in 2021 (Table 1). When the rate of maternal deaths per hundred thousand live births is analyzed by years, it is 23.0 per hundred thousand in 2017; 7.9 in 2018; 16.8 in 2019; It was found to be 45.4 per hundred thousand in 2020, and 54.7 per hundred thousand in 2021 (Table 1).

The mean age of the mothers who died was 32.7±7.3 years, and the median was 29 (min=21-max=48). Ten (58.8%) mothers lived in the city center, and seven (41.2%) lived in the district. Four of the mothers (23.5%) had grand multiparity. Eight of the mothers (47.1%) had maternal risk factors. Five (29.4%) deaths occurred during pregnancy, and 12 (70.6%) died during puerperium. Fourteen (82.4%) deaths occurred in hospital and three (17.6%) at home. Two of the deaths (11.8%) were direct and nine (52.9%) were indirect maternal deaths, while two (11.8%) could not be decided, and a ministry commission decision is awaited for four (23.5%). Five (29.4%) of the deaths were preventable, six (35.3%) could not be prevented, two (11.8%) could not be decided, and for four (23.5%), a ministry commission decision is awaited. Of the five preventable deaths,

four (80%) were type 1 delay, and one (20%) was type 3 delay (Table 2).

When analyzed by education level, two (11.8%) of the mothers were illiterate, five (29.4%) were primary school graduates, three (17.6%) were secondary school graduates, one (5.9%) was high school graduate, and six (35.3%) were university graduates (Figure 1).

When the causal distribution of maternal deaths was examined, seven (41.2%) were cardiovascular causes, one (5.9%) embolism, one (5.9%) bleeding, one (5.9%) infection, and one (5.9%) other causes, while six (35.3%) could not be diagnosed. Moreover, a ministerial decision is awaited.

When women who had a live birth in Adiyaman in 2017 were examined, it was determined that 10,623 mothers were under 35 years of age, and 2,382 mothers were 35 years of age and older. In 2017, it was determined that mothers who gave birth at the age of over 35 had 8.92 times higher risk of death

compared to mothers who gave birth under the age of 35. This risk was not found to be statistically significant (p=0.088). When women who had a live birth in Adiyaman in 2020 were examined, it was determined that 8,907 mothers were under 35 years of age, and 2,071 mothers were 35 years and older. It has been determined that mothers who gave birth at the age of over 35 in 2020 have a 6.45 times higher risk of death compared to mothers who gave birth under the age of 35. This risk was found to be statistically significant (p=0.05). When women who gave live births in Adıyaman in 2017-2020 were examined, it was determined that 48,080 mothers were under 35 years of age, and 11,198 were 35 years of age and older. It has been determined that mothers who gave birth at the age of over 35 in 2017-2020 have a 3.00 times higher risk of death compared to mothers who gave birth under the age of 35. This risk was statistically significant (p=0.028) (Table 3).

Table 1. Distribution of maternal deaths by years.

	Number of live births	Number of maternal deaths	Maternal mortality (per one hundred thousand)
2017	13.049	3	23.0
2018	12.552	1	7.9
2019	11.902	2	16.8
2020	11.019	5	45.4
2021	10.979	6	54.7
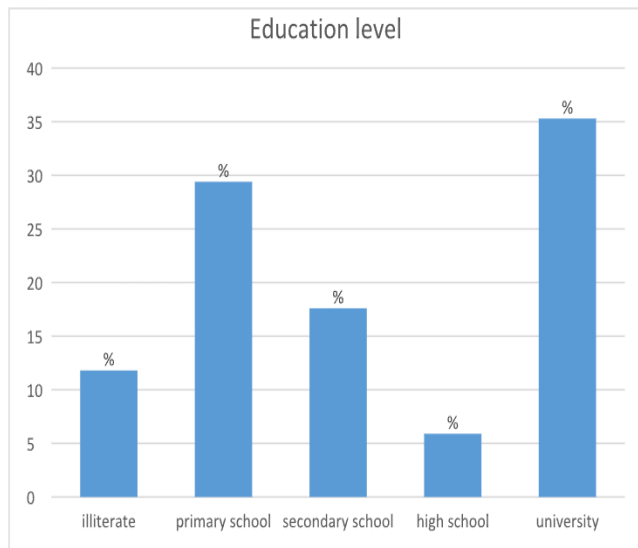
Figure 1. Maternal mortality by education level.

Table 2. Various characteristics of maternal deaths.

		Number	%
Age category	<35	10	58.8
	≥35	7	41.2
Resident place	Province	10	58.8
	District	7	41.2
Grand multiparity	Yes	4	23.5
	No	13	76.5
Maternal risk factors	Yes	8	47.1
	No	9	52.9
Period of death	Pregnancy	5	29.4
	Postpartum	12	70.6
Pregnancy outcome	Live birth	10	58.8
	The birth did not occur	7	41.2
Place of death	Hospital	14	82.4
	Home	3	17.6
Classification	Direct	2	11.8
	Indirect	9	52.9
	Could not be decided	2	11.8
	Waiting for the Ministry Commission's decision	4	23.5
Preventability status	Preventable	5	29.4
	Irrepressible	6	35.3
	Could not decide	2	11.8
	Waiting for the Ministry Commission's decision	4	23.5
Delay type	First delay	4	80.0
	Third delay	1	20.0

Table 3. Probability of death by age groups in 2017-2021.

	Number of births		Number of deaths		Mortality rate (per one hundred thousand)		p	Likelihood ratio (LR)	LR 95% confidence borders
	<35	≥35	<35	≥35	<35	≥35			Below-Over
2017	10623	2382	1	2	9.41	83.96	0.088	8.92	0.81-100
2018	10052	2443	1	0	9.95	0	-	-	-
2019	9629	2228	0	2	0	89.77	-	-	-
2020	8907	2071	2	3	22.45	144.86	0.05	6.45	1.01-38.46
2021	8869	2074	6	0	67.65	0	-	-	-
Total	48080	11198	10	7	20.80	62.51	0.028	3.00	1.14-7.87

Discussion

Monitoring of maternal mortality is carried out strictly in Turkey. The first reliable source of data on maternal mortality was obtained in 2005 with the National Maternal Mortality Study (NMMS) within the scope of the Reproductive Health Program, a project of the Ministry of Health. The Ministry of Health started follow-ups in 2007.

According to the NMMS conducted in 2005-2006, maternal mortality rate was 28.5 per hundred thousand. While it was 20.7 per 100,000 live births in urban areas, it was determined as 40.3 per 100,000 live births in rural areas. Again in the same study, 78.8% of maternal deaths were determined as direct and 21.2% as indirect maternal deaths. In the maternal mortality study conducted by the Public Health Institution of Turkey in 2014, the maternal mortality rate was 15.2 per hundred thousand (4). According to the National Center For Health Statistics report on the maternal mortality rates in the USA, the maternal mortality rate was 17.4 per hundred thousand in 2018, 20.1 per hundred thousand in 2019, and 23.8 per hundred thousand in 2020. Our study evaluated only Adiyaman province and calculated 5-year mortality statistics. Accordingly, the maternal mortality rate was calculated as 23 per hundred thousand in 2017, 7.9 per hundred thousand in 2018, 16.8 per hundred thousand in 2019, 45.4 per hundred thousand in 2020, and 54.7 per hundred thousand in 2021. Although there is a decrease in maternal mortality throughout the country, a significant decrease was observed in Adiyaman in 2018, but an increase was observed in 2019. Among the reasons for this change, of course, there are direct or indirect effects of the COVID-19 pandemic, but some measures and training should be taken to eliminate other possible effects. In order to increase the awareness among both institutions and the public, action plans have been created by the Adiyaman Health Directorate, and especially risky pregnant follow-ups are carried out close by the directorate and its affiliated centers. The positive results of the studies are expected to be seen in the coming years.

A high number of births is considered a risk factor for maternal death. In a multicenter study conducted in Nigeria, the risk of maternal death increased as the number of births increased. The risk of death in mothers with grand multiparity is 6.89 times higher than in those without delivery (5). Sencan et al. (4) found that 11.7% of mothers in maternal deaths in Turkey in 2014 were grand multiparous patients. In our study, 23.5% of mothers who died were found to be grand multiparous, which may be related to the decrease in mothers' demand for healthcare services as parity increases. In order to prevent grand multiparity, it is essential to encourage the use of effective birth control methods and to provide such services free of charge to the Ministry.

The relationship between educational status and maternal death is one of the issues that has not been clarified. Yego et al. (6) in Kenya, the risk of maternal mortality increased as the level of education decreased. Kisuule et al. (7) also found that the risk of maternal death was higher in illiterate women. Alosaimi et al. (8) found no significant difference between educational status and maternal mortality. In our study, about one-third of the mothers who died were university graduates, which may be related to increasing childbearing age in women with university degrees.

Maternal age is one of the most critical risk factors for maternal mortality (9). In a study involving 144 countries, maternal mortality was examined according to the age of the mothers, and the maternal ages were categorized at five-year intervals. According to this, while the graphical representation of maternal deaths was J-shaped, it was slightly higher at ages 15-19, decreased at ages 20-24, and maternal mortality rate increased as the age group increased. Again, in the same study, the slope of the maternal mortality rate increases visibly after age 35 (10). Again, Blanc et al. (11) similarly observed a decrease in the death rate between the ages of 20-24, and the maternal mortality rate increased with age. Sencan et al. (4), in a Turkey-wide study found that maternal mortality is more common at the age of 35 and below and that mothers who gave birth at the age of over 35 carry a 3.30 times higher risk of death compared to mothers who gave birth under the age of 35.

Similarly, in our study, the number of maternal deaths under the age of 35 was found to be higher, but it was revealed that mothers over 35 years of age had a 3.0 times higher risk of death compared to those under 35 years of age. As can be seen, the risk of death increases with the mother's age over 35, and raising public awareness regarding childbearing age is essential. However, an important pillar of this falls on the health providers. Pregnant women over the age of 35 should be considered risky pregnancies and should be followed closely.

Conclusion

Although maternal deaths in the Adıyaman province of Turkey may fluctuate over the years, they increased in 2020 and 2021 when the COVID-19 pandemic was dominant. Advanced maternal age is a significant risk factor. It is essential to take a series of measures and implement them in order to prevent the increase in maternal mortality and advanced maternal age. In order to do this, one of the primary steps is to follow the risky pregnant women closely.

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